Day 1
Closing remarks

Margarita Pavlova

Education University of Hong Kong

16 June 2017

Issues discussed

- Manpower and economic development
- Policies on skills development
- Partnerships and skills-based innovation
- Governance of TVET systems
- Purposes of TVET
- Occupation specific knowledge and skills and generic skills
- TVET at all levels (from secondary to HE)

Reflect on

- Economy – manpower-competitiveness
- Policy
- Innovation
- Benchmarking and role of TVET; and
- TVET college initiatives

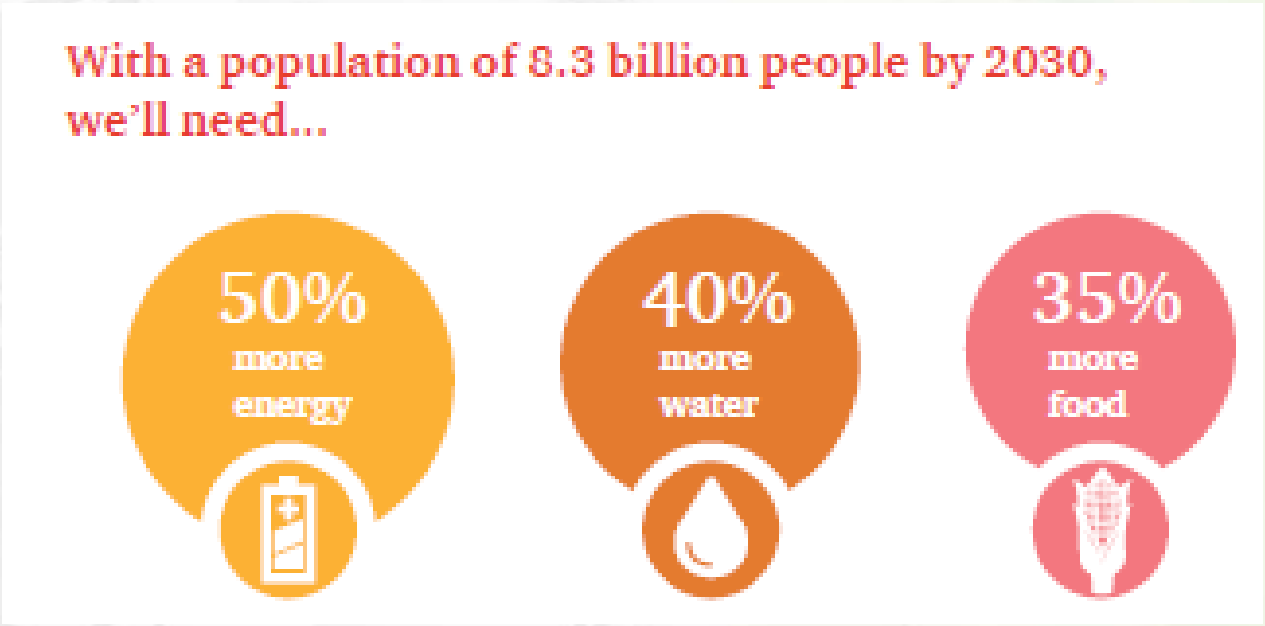
Economy – manpower-competitiveness

Megatrends

- "Megatrends are macroeconomic forces that are shaping the world. They are factual and often backed by verifiable data. By definition, they are big and include some of society's biggest challenges—and opportunities" (pwc, 2014)
- "Mega Trends are transformative, global forces that define the future world with their far reaching impacts on business, societies, economies, cultures, and personal lives" (Frost & Sullivan)

  - ***Accelerating urbanization***
  - ***Climate change and resource scarcity***
  - ***Demographic shifts***
  - ***Shift in global economic power***
  - ***Technological breakthroughs*** (pwc, 2014)

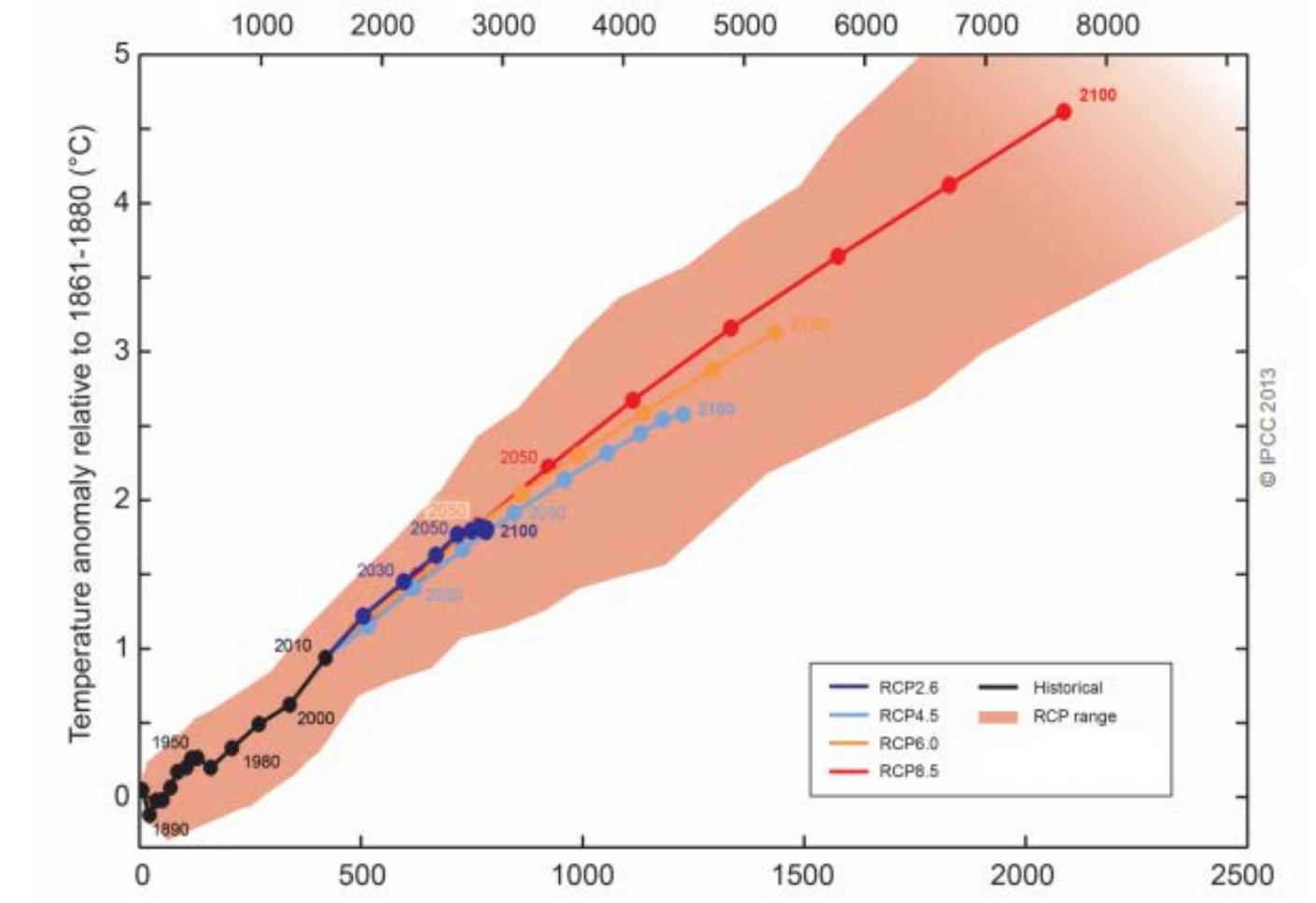
Climate change and resources scarcity



Source: National Intelligence Council: Global trends 2013:Alternative Worlds cited in PWC, 2014

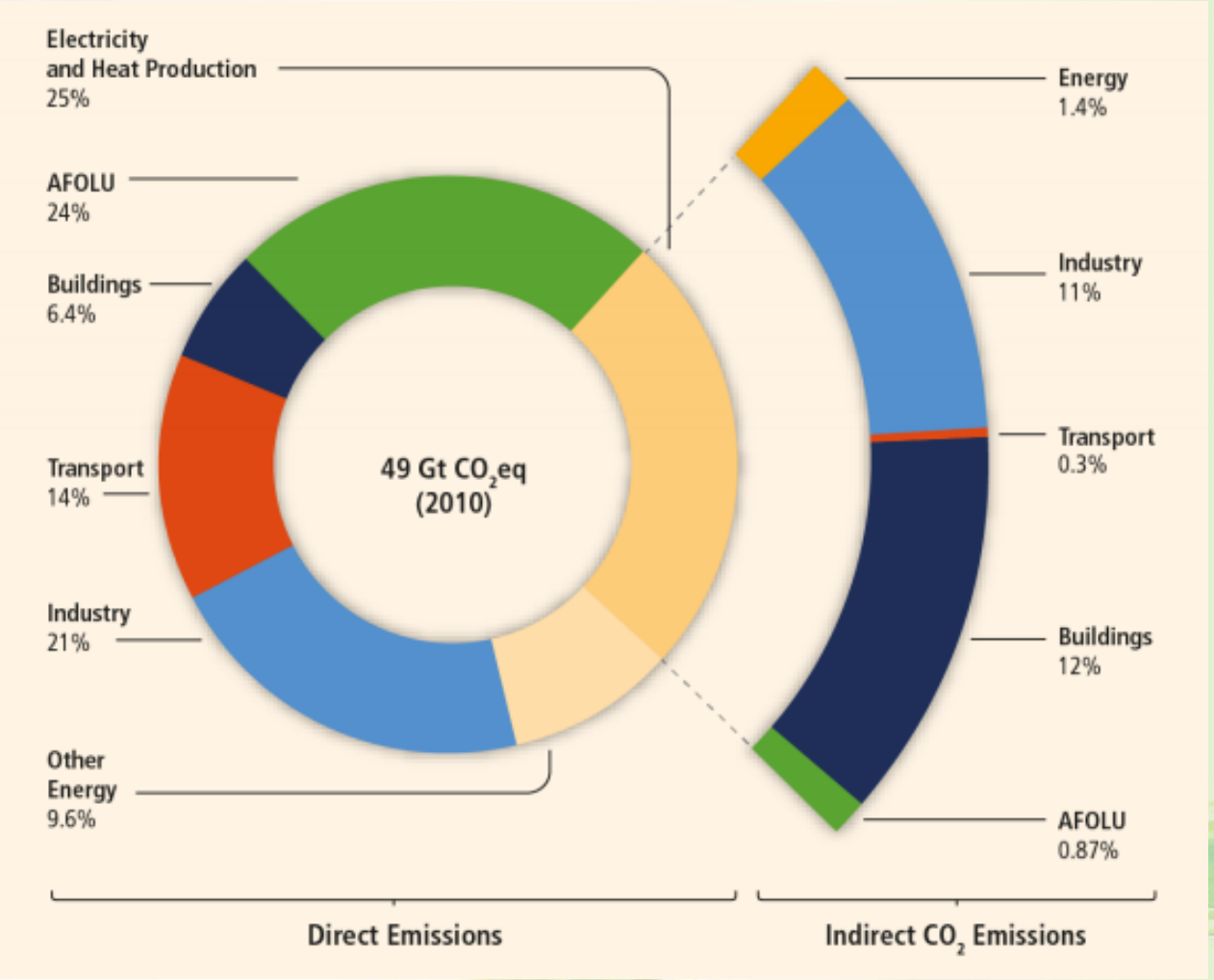
New industries created, or existing ones revolutionized, in response to energy scarcity, climate change and lack of resources; the pace of these changes will be accelerated by new technologies.

Cumulative total CO2 emission from 1870 (GtC) caused by human activities



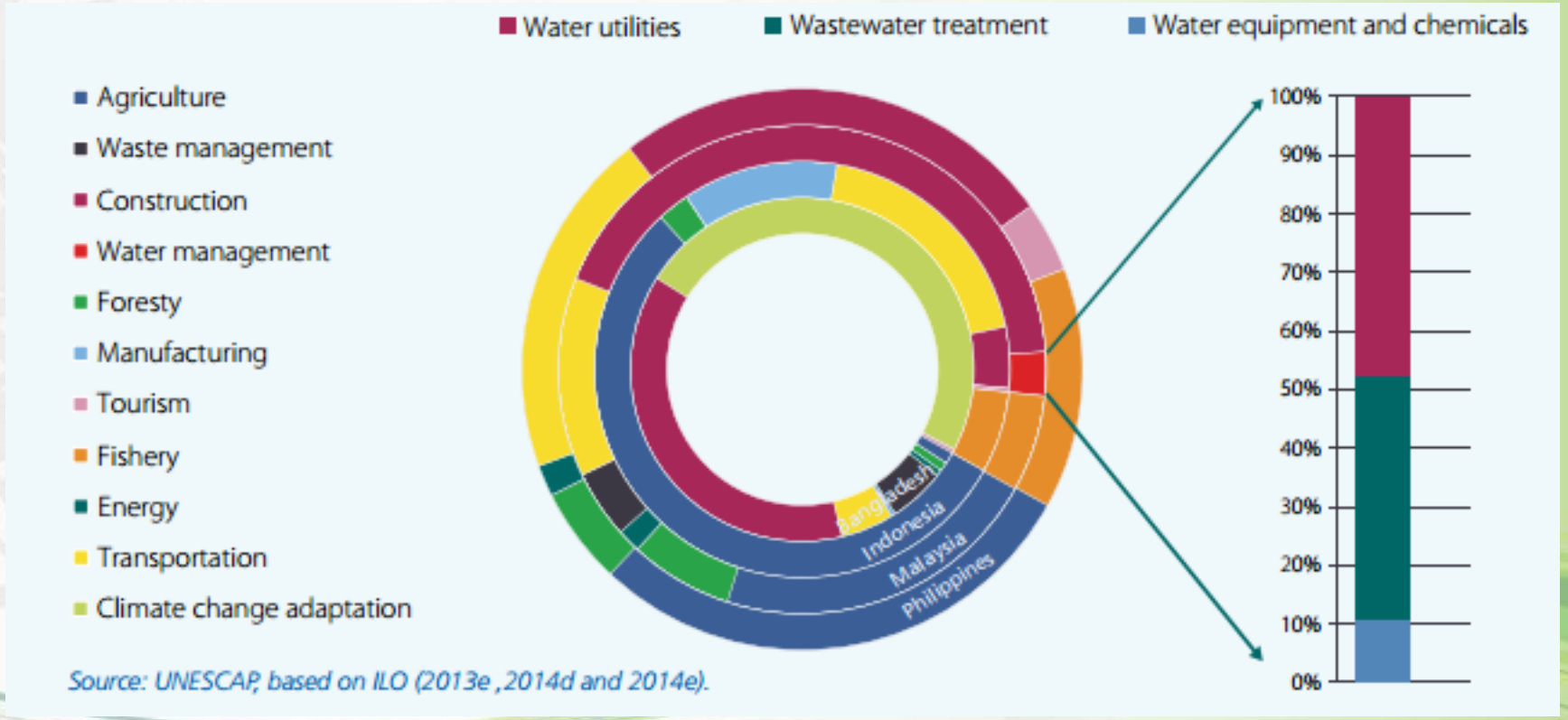
Representative Concentration Pathway (RCP) defines a specific emissions trajectory. GtC - Giga tonne Carbon

Greenhouse gas emissions by economic sectors (worldwide)



Intergovernmental Panel on Climate Change (2014).The Fifth Assessment Report (AR5).

Estimated core environmental-related jobs through green mapping studies in four South-East Asian countries (2010-2012)

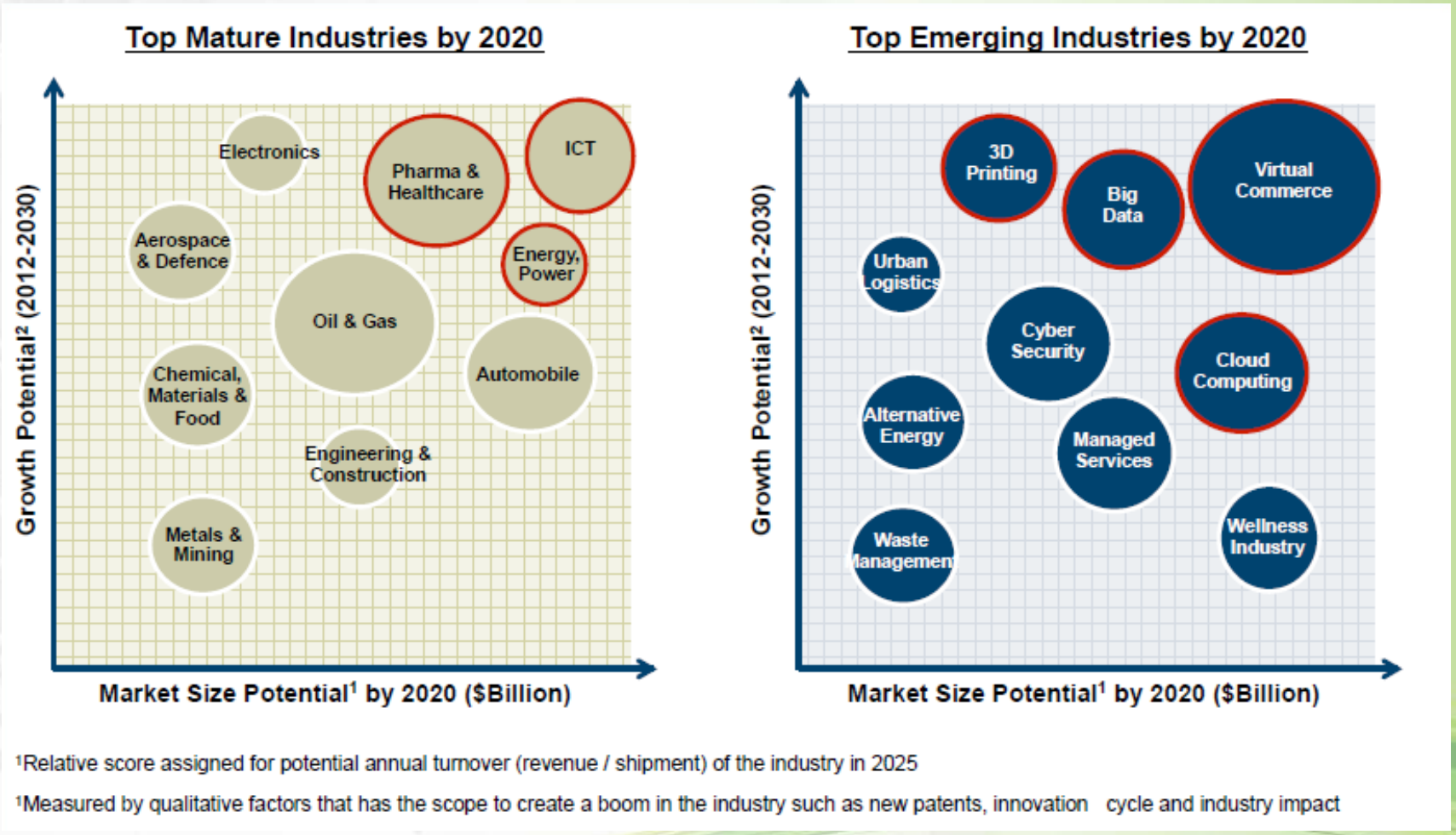


UN WWAP (2016). WATER AND JOBS

Focus on technology - Malaysia

- Malaysian government recognizes technology among the key drivers for green economic growth. **The National Green Technology Policy** was launched in the country in 2009 to provide directions for development including the growth of **green technology industry** that should minimize environmental degradation, has zero or low greenhouse gas emission; is safe to use and promotes healthy and improved environment for all forms of life, conserve the use of energy and natural resources and promotes the use of renewable resources.
- Green technology development and its inclusion in training programs. The Roadmap on Green Technology prepared by the National Green Technology Centre includes training provision.

Top industries of the future

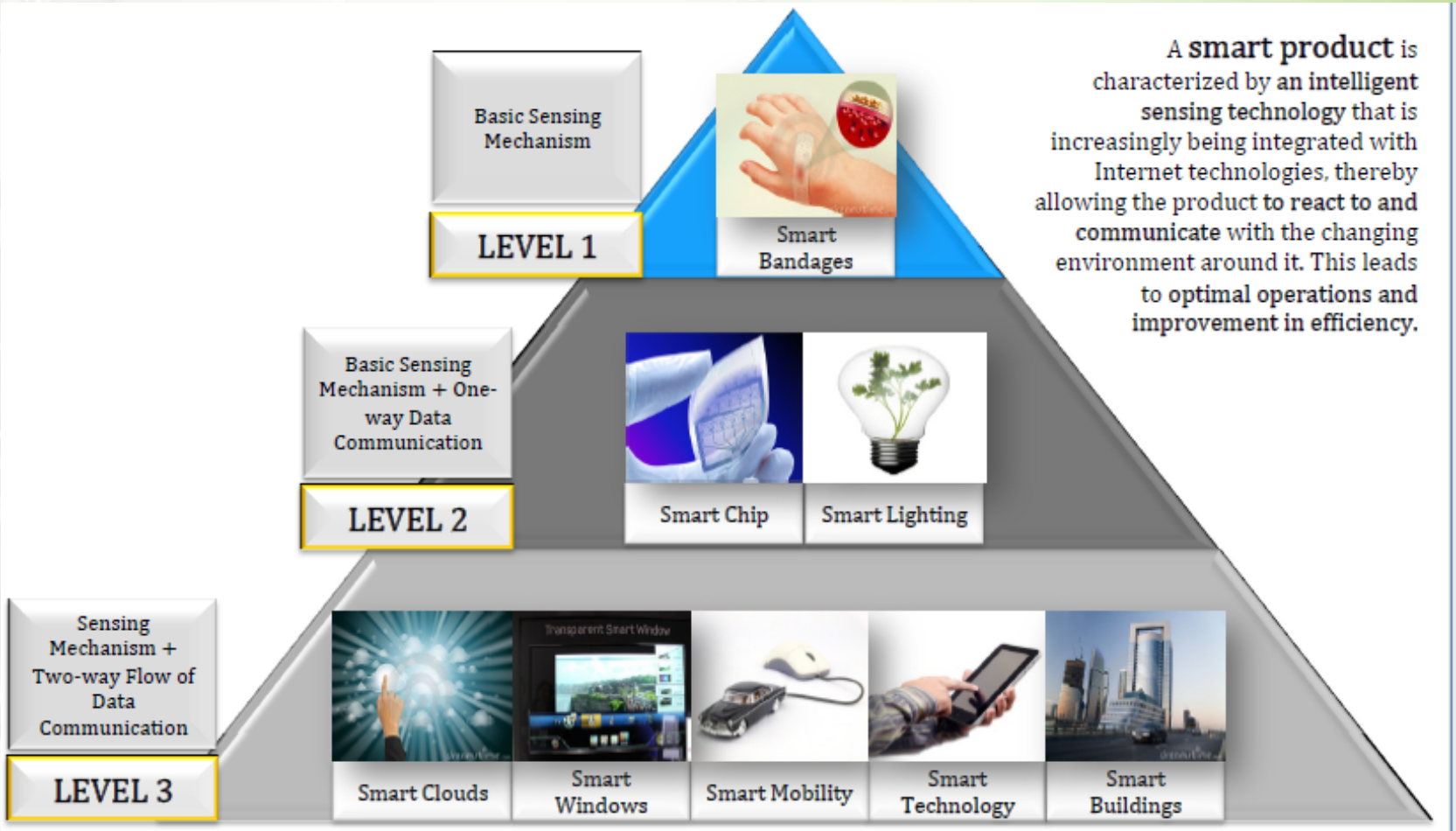


[1]Relative score assigned for potential annual turnover (revenue / shipment) of the industry in 2025

[1]Measured by qualitative factors that has the scope to create a boom in the industry such as new patents, innovation cycle and industry impact

Source: Bloomberg, Frost and Sullivan Analysis

Smart technologies



Forest City – the Future is here

The construction sector in Asia

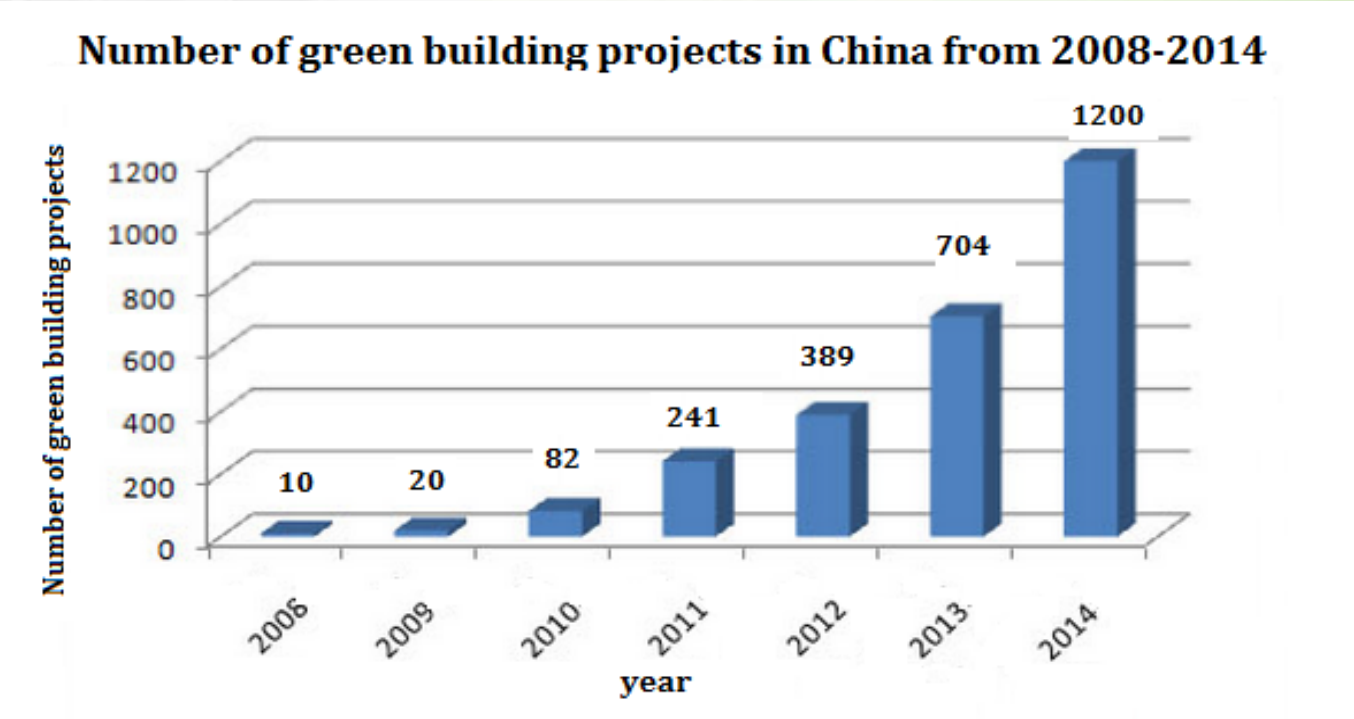
Construction spending by country 2013 (US$)

Construction spending growth 2014-19 (% per annum)

Source: IHS Global Insight (2013) cited in AECOM, 2014

Construction spending in Asia accounted for 44 percent of total global construction spending in 2013 (AECOM, 2014)

Green building sector in China



Source: (IGEBC, 2014)

- Introduction of the Chinese Green Building Standard
- Annual growth rate of 60 % in the green building sector (EU SME Centre, 2013)
    - Creates energy-saving opportunities at the market
    - Demand for skill training in construction increase

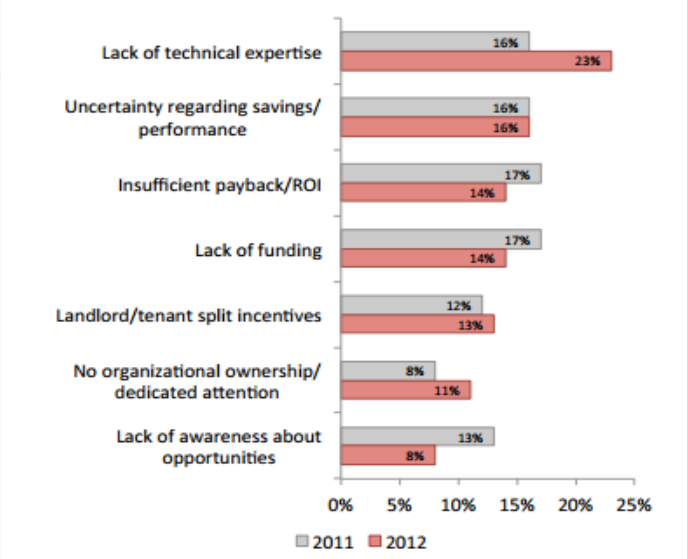
Skills shortages: labor shortages and skill gaps - future

Difficulties in filling positions due to lack of available talent

Countries	Percentage of employers who experience difficulties
India	67%
China	24%
Japan	80%
Australia	54%
New Zealand	44%
Singapore	44%

Source: Aring, 2012

Barriers to invest in green buildings in China, 2012 versus 2011



Source: EU SME Centre, 2013

Estimation of green job numbers in construction

Country	Green jobs or environment-friendly job estimates (% of total employment) and N of places	Total No. of Jobs
Malaysia	1.11 to 4.74% (10,906 – 46,155)	974,488
Philippines	11% (211,090)	1.9 million
Mongolia	5.2% (3,610)	69,300

Sources: Complied by the author, based on ILO (2014)

Skills gap: construction

Unfulfilling demand of occupations in the following areas:	Occupations considered to be the most in-demand in the next five years:	Important soft skills required for tradesmen
• green building expertise • professionals handling engineering works with green building expertise • quantity surveyors • safety engineers • energy designers and managers • sustainability officers, waste management officers • marketing personnel with significant knowledge in green building	• Architects, • Engineers, • BERDE Assessors, • Green Building Certifiers, • Green Material Suppliers, • Maintenance/Project Managers, • Electrical/Energy Managers, • Sanitation Personnel, and • Mechanical/Laborer with Green Building Know-how	• strategic skills, • environmental awareness and sustainable development, • coordination, • management and business skills, and • innovation (Mondal, Iqbal and Mehedi, 2010

Sustainable Development Goals

Economic competitiveness and human capital/ human

	Primary education indicators (pillar 4)	Higher education indicators (pillar 5) + brain drain (7.09)	Innovation indicators (pillar 12)	*Total human capital*	*Institutions (pillar 1)*	*Infrastructure (pillar 2)*	*Macroeconomy (pillar 3)*
Factor-driven stage (1)	7.5%	6.8%	2%	***16.3%***	*15%*	*15%*	*15%*
Efficiency-driven stage (2)	5.0%	9.7%	4%	***18.7%***	*10%*	*10%*	*10%*
Innovation-driven stage (3)	2.5%	9.7%	12%	***24.2%***	*5%*	*5%*	*5%*

Source: Sabadie and Johansen, 2010, p. 244

Global Sustainable Competitiveness Index, 2014 – Asia and the Pacific

COUNTRIES	RANK	(SCORE)
Japan	6	(6.06)
New Zealand	8	(5.99)
Australia	15	(5.67)
Malaysia	21	(5.22)
Republic of Korea	22	(5.05)
China	31	(4.62)
Thailand	35	(4.51)
Russian Federation	42	(4.33)
Kazakhstan	44	(4.30)
Sri Lanka	45	(4.28)
Indonesia	46	(4.28)
Turkey	47	(4.27)
Philippines	49	(4.25)
Viet Nam	65	(3.89)
India	68	(3.85)
Cambodia	75	(3.71)
Nepal	77	(3.70)
Iran, Islamic Republic of	78	(3.68)
Bangladesh	92	(3.5)
Kyrgyzstan	95	(3.47)
Mongolia	96	(3.45)
Pakistan	105	(3.08)
Timor-Leste	109	(2.78)

Source: Compiled by the author from: World Economic Forum. (2014). *Sustainability-Adjusted Global Competitiveness Index (GCI)*.

Policy

The changing world of skills and work: and education

*Without sufficient **investment in skills**, people languish on the margins of society, technological progress does not translate into productivity growth, and countries can no longer compete in an increasingly knowledge-based global economy… many [countries] continue to struggle with low level of adult basic skills, problems of skills mismatch, skills shortages and unemployment (OECD, 2013, p.60)*

Overarching policies

- The *National action Plan for Haritha Lanka Program* (Sri Lanka, National Council for Sustainable Development, 2009);
- *The Vietnam Sustainable Development Strategy for 2011-2020* (Vietnam Government, 2012);
- *The Vietnam National Green Growth Strategy* (Vietnam Government, 2012);
- *The National Action Plan for Climate Change and its Eight Missions in India* (Prime Minister's Council on Climate Change, 2012);
- *The 12th Five-Year Plan for Economic and Social Development of China* (2011-2015) (The Central People's Government of the People's Republic of China 2011);
- *Law of the Republic of Indonesia No.17/2017 on the Long Term National Plan 2005-2025*;
- *Mongolian National Environmental Policy Development Parliament's resolution* #47, 2014 (outlines long-term integrated strategies for economic development in the context of climate change and low-carbon growth).

Policies vs. Training provision gaps – the Philippines - future

- Analysis of government policies and existing TVET provisions identified gaps in the following training areas:
- **Technicians**: Methane/land field gas generation system; biofuels processing; biomass plan; wind turbine service; hydroelectric plant; geothermal; edible vertical gardens; renewable energy
- **Workers**: air/water pollution control; Methane/land field gas collection system

TESDA Green Technology Centre – the Philippines

Built in partnership with the Federation of Filipino Chinese Chambers of Commerce and Industry Inc. (FFCCCI), the TESDA Green Technology Center (GTC) will serve as the green skills hub, which will offer training courses to cater to the needs for renewable and emerging green jobs.

Skill gaps - Viet Nam

- Governments' plans to set up 10 high-tech agricultural zones and areas in the country by 2020, and another 10 by 2030 set up a very high demand for updating/ topping up skills in agriculture.
- Use of advanced technologies such as solar energy for drying fruits or rice require additional skills. Seminars organized by donors/investors to support local farmers in topping up their skills through learning about new practices can provide the required in-service training.
- However, TVET should respond quickly by adjusting their training programs to support the demand initiated by the government initiative to minimize the skills gaps.

Green jobs in construction (green buildings)

Six clusters of green occupations classified by ILO (2011)

- **Conceiving, planning, designing and advising**

(Construction company/Managers and Business Functions; Architects and civil/structural/ Environmental Engineers; Architectural Technicians/ Technical Drawing Specialists; HVAC, Electrical, Mechanical, Sanitary, RE & Building Services Engineers/ Designers; Surveyors; Energy and Water Efficiency and Waste management Analysts, Consultants and Advisors)

- **Construction, installation and maintenance**

(Building Site Supervisors, Site Engineers and Site Architects; Conservation; Building Level Renewable Energy [and High Efficiency Energy] Systems)

- **Controlling**

(Energy Auditors; Inspectors, Certifiers and Quality Controllers)

- **Enabling**

(Policy Makers; Urban Planners; Financing; Educators and Information Providers; Researchers)

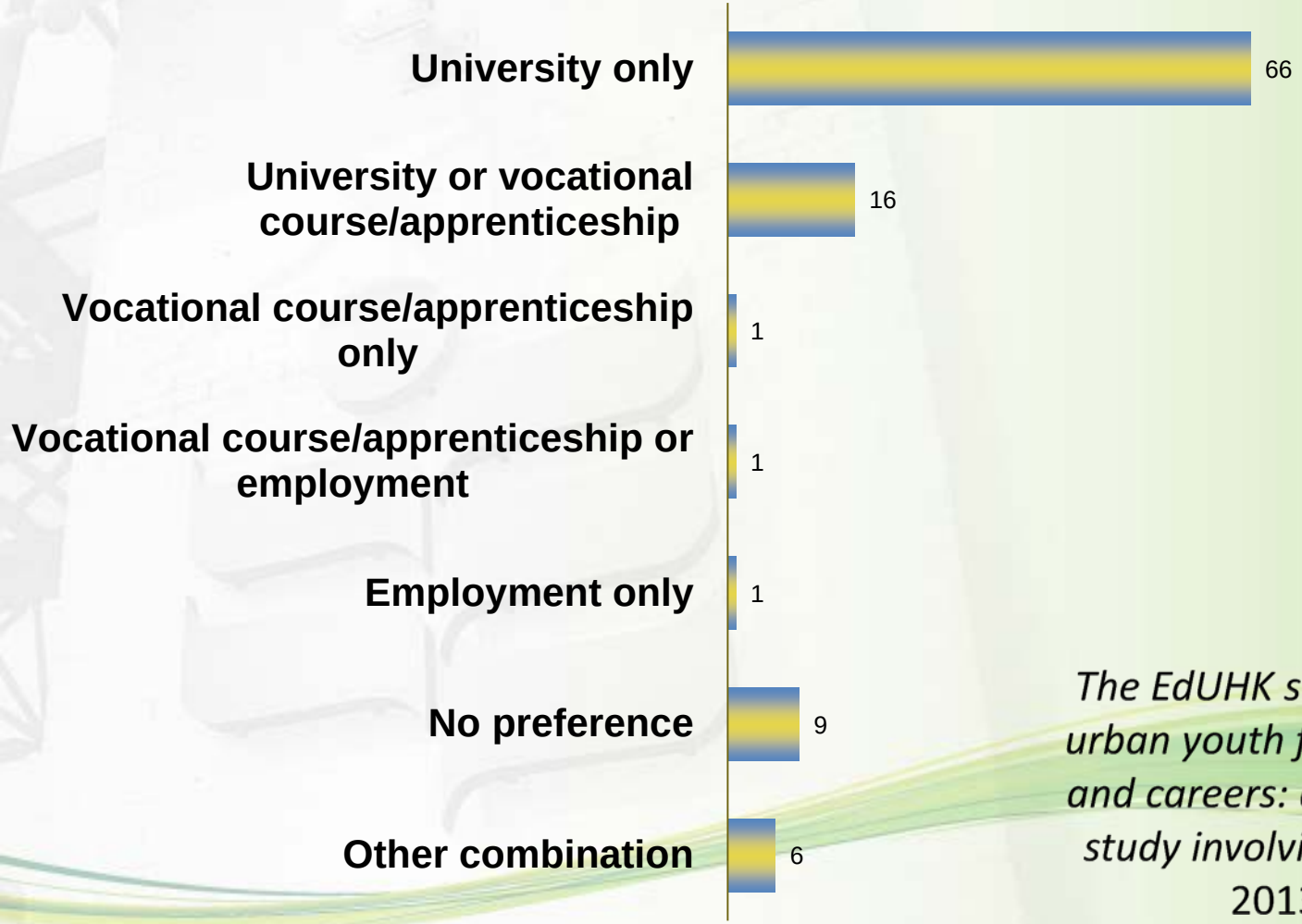
- **Manufacturing and distribution**

(Manufacturers and Distributors of Green Building Materials and Products; IT & System Technicians)

- **Green building clients**

(Developers; Energy Managers, Facilities Managers and Building Managers; Public Servants Working in Procurement and Management of Buildings; Householders and Tenants) (ILO, 2011).

Parents preferences for students plans after leaving school

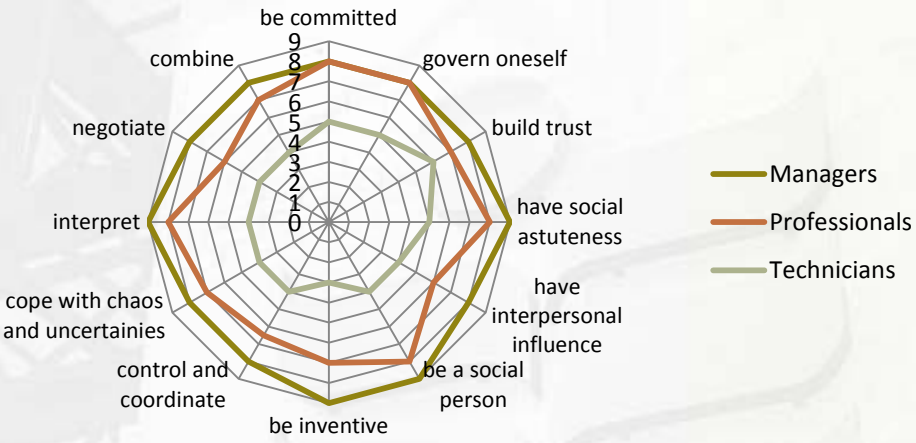


The EdUHK study: Preparing urban youth for further study and careers: an international study involving Hong Kong, 2013-2016

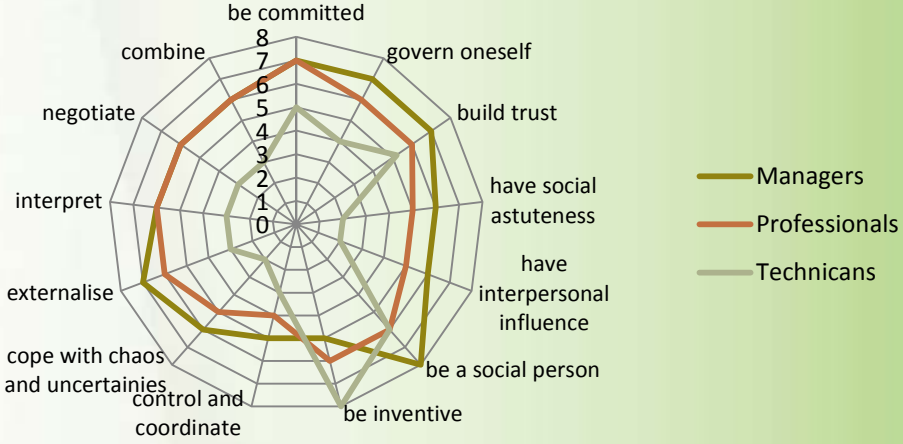
Innovation

Competencies for dealing with tasks and challenges

Competences for dealing with tasks and challenges Company 1 (at present)



Competences for dealing with tasks and challenges company 2 (at present)



Benchmarking and role of TVET

The new Greening TVET continuum

UNESCO-UNEVOC, Bonn

Bemchmarking: What is regional/local engagement?

- Diverse ways of interaction among institutions (staff and students), public agencies, business community, not-for-profit organisations and community groups to facilitate knowledge exchange, sharing of skills and experience;
- Relationship between providers and the communities within their locality

Benefits:

- improve students learning
- benefit the social, economic and cultural development of the region
- benefit the quality of life and opportunities in the region
- improve well-being of the region
- make broader international connections

Forms of regional/local engagement

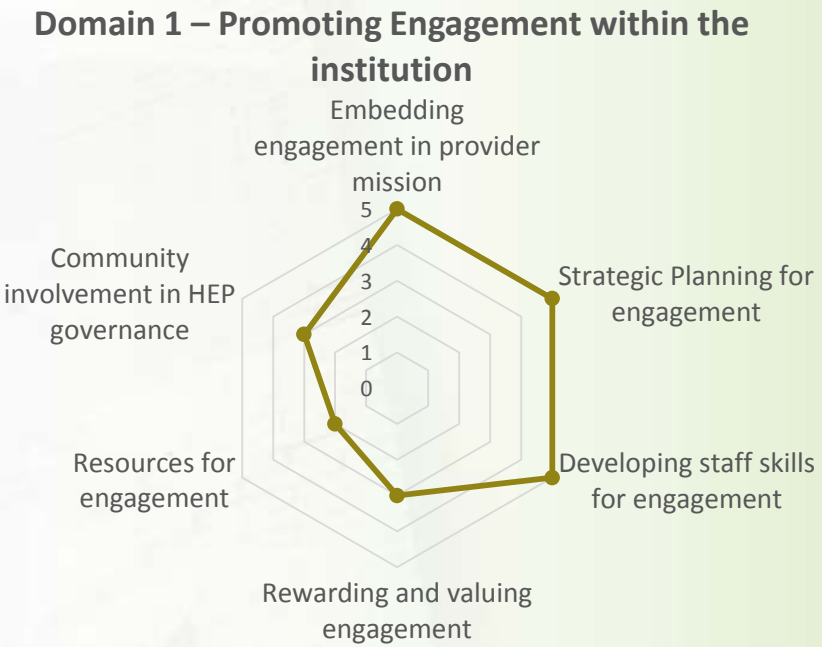
- Formal such as partnerships
- In-formal: depends on the particular interests of individual staff and students
- Direct contribution to service provision, economic development and health and well-being in the region
- Engagement in areas with respect to the social, economic and cultural life in a region

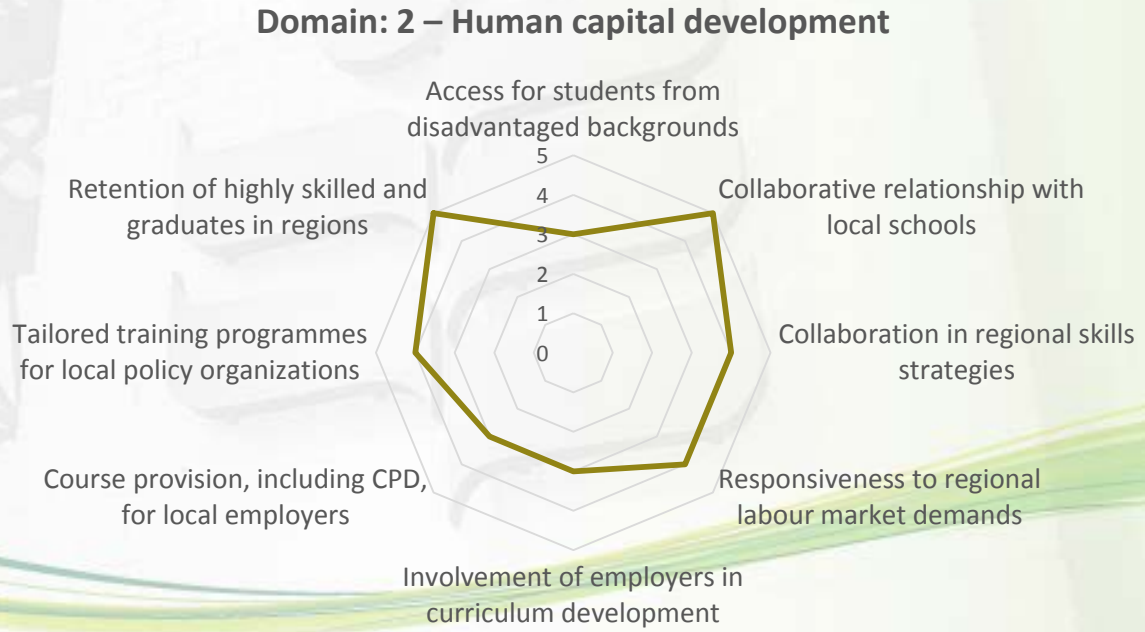
Benchmarking domains

1. Institutional processes for promoting, managing and supporting engagement
2. Developing human capital
3. Developing regional learning processes and social capital
4. Developing business processes and innovation
5. Community development processes
6. Cultural development
7. Promoting good practice in sustainable development
8. Contributing to regional infrastructure and development processes (An additional domain is concerned with institutional processes through which 'drive' and encourage engagement activity)

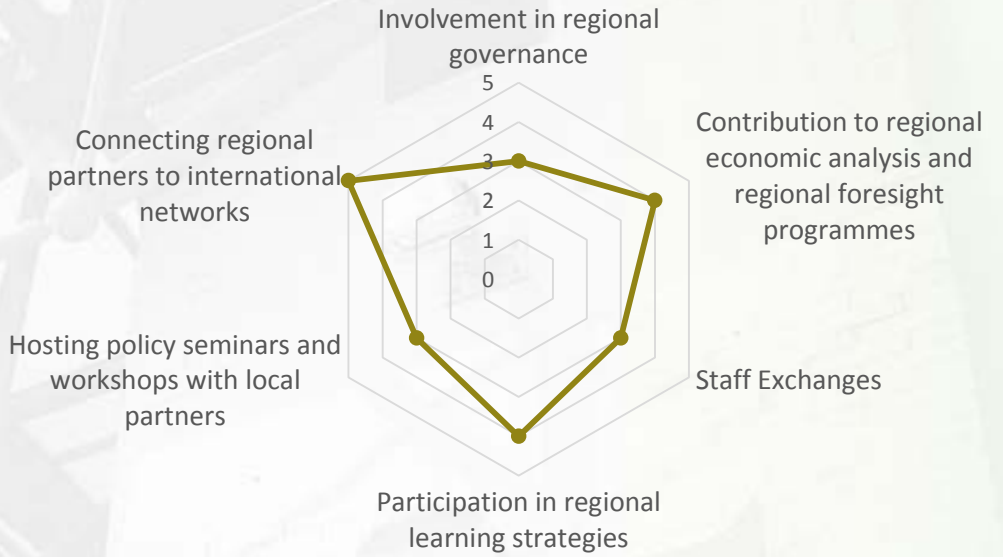
The methodology (developed by Glasgow university, Scotland) based on Charles for HEFCE (2002)

Data of the Institution 1





Domain 3 – Developing regional learning and social capital

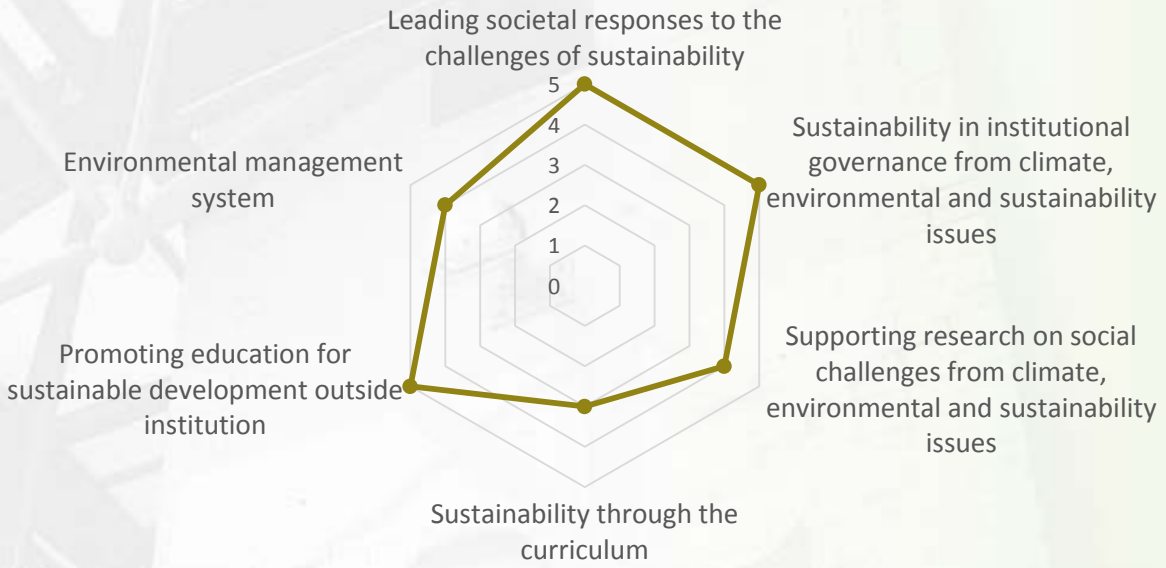


Domain 4 – Business development processes

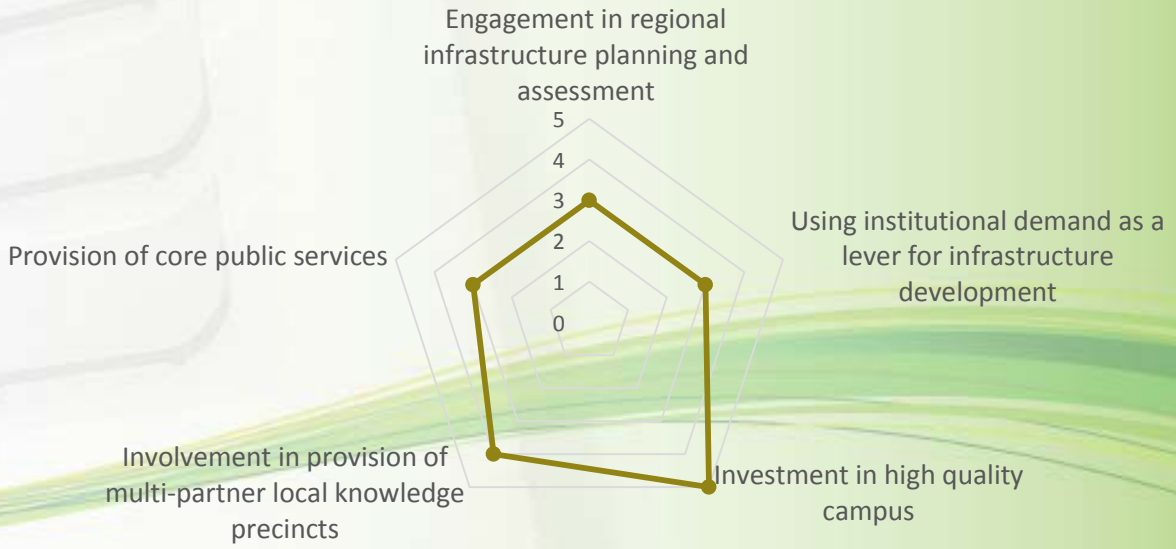
Domain 5 – Community development processes

Domain 6 - Cultural development

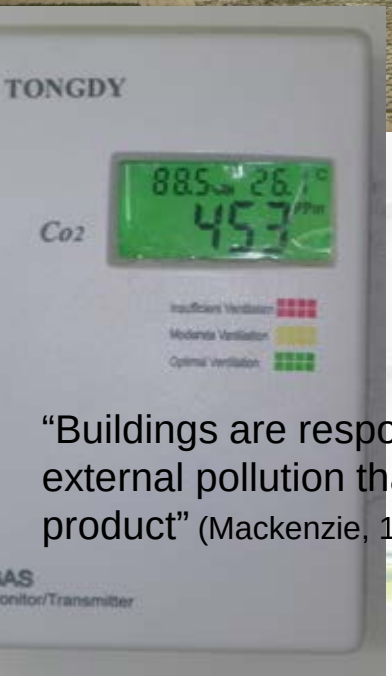
Domain 7 – Promoting sustainability



Domain 8 – Regional infrastructure planning and development



TVET college initiatives



“Buildings are responsible for more external pollution than any other product” (Mackenzie, 1997, 38)

Academi Technik Mesin Industru (ATMI)

SMK 27

ATMI

ATMI Kreasi Energi

smart energy for better living

SunPulse Water

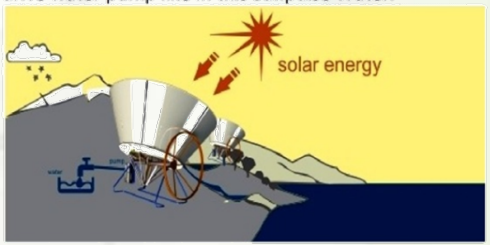
Solar Water Pump

The SunPulse Water is a world-leading low-temperature Stirling engine water pump for decentralized water supply and distribution. It is particularly simple to construct and can therefore be produced locally.

Concept

The SunPulse Water can pump water from various depths according to the water pump which has been installed with the engine. The effectiveness of the engine can be increased with additional water tank. The machine is working when the sun is shining and the distribution of the water for irrigation or to the houses can be done out of the tank even when there is no sunlight.

This machine uses the sunlight to heat the air inside the engine and the pumped water to cool it again, resulting to pressure fluctuations inside the engine, which are moving a piston. The piston will turn the flywheel, then rotation of fly wheel can be used for various applications, for example to drive water pump like in this Sunpulse Water.



Application

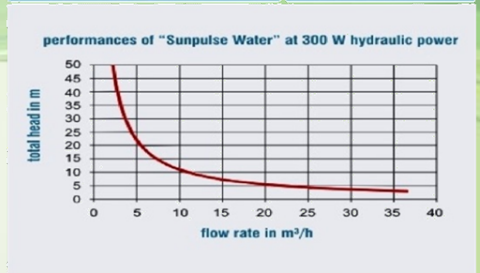
- ✓ Suitable for developing countries that the majority of the population depends on home grown agricultural products.
- ✓ Can be produced with the simple facilities available in sunbelt countries.
- ✓ Can be put into service as the prime mover in a variety of other applications, such as:
  1. Driving grain mills, power saws, presses etc.
  2. Driving air compressors to store compressed air to be used for pneumatic tools, for water oxygenation, etc.
  3. Driving a generator to produce electricity.
  4. Driving an oxygen concentrator to selectively filter oxygen from atmospheric air.

Technical details

- Dimension : 3600 x 3600 x 3400(mm)(with booster)
  2500 x 2500 x 1800(mm)(without booster)
- Total weight : 650 kg
- Manual daily tracking angle moveable
- Water cooler temperature : max 30°C
- Out rotation of machine : 30 rpm
- Depth of wells : maximum 5 meters (7 meters with special pump)
- Pumping height : maximum 10 meters (60 meters with special pump)

Advantages

- Use sun's rays as energy , so it is environmentally friendly and cost efficient solution.
- Can also be employed to provide drinking water
- SunPulse water with bellow pump can pump from storage lakes or ground water from max. 5 meters deep, and max 10 meters high, this is ensuring the irrigation of an average family business
- can pump deeper till 60 m with by coppling it to a immersed piston pump like **India Mark 2**



Balai Latihan Pendidikan Teknik *(BLPT)* Yogyakarta

Interesting models generated by TVET providers

- Production of green products for skills development
- Establishment of companies by several VTPs
- Start-up companies for greening

Looking forward for day 2